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DRUG RESISTANT DISEASES

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Forward

This report was prepared in response to a request from the Medical Intelligence Office, Office of the Surgeon General, Department of the Army.

TABLE OF CONTENTS

Introduction

This collection of abstracts provides information on Malaria, Japanese B Encephalitis and Melioidosis in the Soviet Union, China and Vietnam obtained from publications dated 1 January 1964 to date.

Our searches concentrated on resistance to therapy, drug resistant forms, incidence, clinical treatment and chemotherapeutics of the diseases. Although primary stress in our malaria search was on Falciparum malaria, there was so little material obtained that it was thought necessary to include items of peripheral interest for their potential value.

A MEDLARS search for references on meliodosis yielded no Soviet-bloc material. As a safeguard, a further search with no restrictions on area or language turned up the brief bibliography given in the appendix. In the other bibliographies items in Russian or Chinese or those of potential primary interest are indicated by a check (✓).

Appended are bibliographies obtained by a MEDLARS search in response to an ATD request.

I. MALARIA

AUTHOR: CHANG Chi-ming (1728/4949/6900)
HUANG Ch'un-jung (7806/2504/2837)
WANG Te-ming (3769/1795/2494)
CHANG Po-ch'i (1728/0130/0796)
TING Hsien (0002/2009)
HSI Wei-nien (1153/0251/1628)

ORG: Yen-ch'eng Special District Public Health and Epidemic Prevention Station, Kiangsu Province

TITLE: "Observation of the Effect of Pyrimethaminum and Sulfadiazinum on Tertian Malaria"

SOURCE: Peking, Chung-hua Nei-k'o- Tsa-chih (Chinese Journal of Internal Medicine), Vol 12, No 5, May 64, pp 425-426

ABSTRACT: Pyrimethaminum is the most popular antimalaria drug in China in recent years. In 1959, Hurly reported that Sulfadiazinum has an obvious effect of improving the action of this drug; therefore, the authors conduct a study with the method of combining the two drugs. The area of experimentation was a simple tertian malaria region, and the 171 cases were all verified by blood examinations. The patients were divided into 6 groups.

AUTHOR: CHOU Hsueh-chang (0719/1331/4545)
CHANG Tsu-sheng (1728/4371/5110)

ORG: Chia-hsing Center for the Prevention and Treatment of Schistosomiasis

TITLE: "Clinical Analysis of 56 Cases of Severe Attacks of Malaria, and A Study of Its Treatment"

SOURCE: Peking, Chung-hua Nei-k'o- Tsa-chih (Chinese Journal of Internal Medicine), Vol 12, No 5, May 64, pp 418-422

ABSTRACT: Attacks of subertian malaria or malignant malaria are critical clinical expressions caused by the malaria protozons. The attacks may be induced by a cold, over fatigue, over eating, or other diseases. The symptoms are not typical and may last one to three days until the patient falls into a coma. If malaria is not positively identified

in the blood, the symptoms may lead to a diagnosis of upper respiratory infection, septicemia, typhus, or acute schistosomiasis, and the treatment will be unduly delayed. This paper reviews the various different symptoms observed by the authors in the 56 cases hospitalized from July, 1962, to October, 1963.

AUTHOR: CHU Chen-tung (2612/7201/2639)

ORG: Kuei-yang Municipal First People's Hospital

TITLE: "Clinical Symptoms in 31 Cases of Malignant Malaria"

SOURCE: Peking, Chung-hua Nei-k'o- Tsa-chih (Chinese Journal of Internal Medicine), Vol 12, No. 5, May 64, pp 415-417

ABSTRACT: The clinical expressions of malignant malaria are rather complicated. The toxic symptoms are extremely severe, and these symptoms may occur at any time. From 1951 to 1961, a total of 115 cases were verified to be malignant malaria in Kuei-yang First People's Hospital through blood or bone marrow tests. The toxic symptoms of these cases were analyzed in the paper.

AUTHOR: FANG, Jui-ying (2455/3843/5391); Pien, Ju-lien (0593/1172/3425); Yang, Pao-chu (2799/1405/3796)

ORG: Pharmacology Teaching and Research Section, Chekiang Medical University, Hangchow (Che-chiang i k'o ta hsueh Yao li hsueh chiao yen tsu, Hang-chou)

TITLE: Screening test of anti-Japanese B encephalitis virus drugs

SOURCE: Yao hsueh hsueh pao (Acta pharmaceutica sinica), v. 11, no. 6, 1964, 375-381

TOPIC TAGS: encephalitis, chemotherapy, drug effect, virus

ABSTRACT: Out of forty-seven kinds of drugs experimentally tested in mice infected with Japanese B encephalitis virus, 9 were shown to possess certain therapeutic effects; they are phenelzine, funacillin, 8-azaguanine, thiosemicarbazide, propadrine, deoxyephedrine, phenylhydrazine, isonicotinylhydrazide, 6-MP. Of particular interest was the observation that phenelzine and funacillin inhibited the multiplication of Japanese B encephalitis virus in mouse brain. By analyzing the relationship between chemical structures and therapeutic actions of such effective substances as hydrazine benzyl compounds, cyclo semicarbazide, ephedrine analogues, anti-purine compounds, it is reasonably expected that those compounds may be used as tools for further studies to throw additional light on the chemotherapeutic mechanism of action against Japanese B encephalitis virus. The authors express thanks to Prof. CHU Heng-pi (2612/1854/3880) for reading the manuscript. Orig. art. has: 4 tables. [FDD]

AUTHOR: HO Ch'i (0149/3823)

ORG: Institute of Parasitology, Chinese Academy of Medical Sciences

TITLE: "Chinese Studies on Malaria"

SOURCE: Peking, Chung-hua Nei-k'o- Tsa-chih (Chinese Journal of Internal Medicine), Vol 12, No 5, May 64, pp 466-468

ABSTRACT: This paper reviews the accomplishments in malaria studies in China since the inclusion of the elimination of the five parasites of China in an Outline for National Development of Agriculture (draft) by the party and the central government in 1956. The major achievements discussed in the paper include: 1. The study concerning the division of malaria regions and the respective control policy of each region; 2. The study on permanent cure for tertian malaria; 3. The study on mediums and carriers of malaria.

AUTHOR: HO Ch'i (0149/3823)
HUANG Wen-hsun (7806/2429/3168)
HSUEH Ai-Tseng (5641/1947/2582)
CHU Fu-yao (2612/4395/5069)
LIU Yin-lung (0491/0692/7893)
YANG Ch'ing-chang (2799/1987/3864)
CHANG Ching-chih (1728/2529/2535)
FU Yun-fang (0265/7301/5364)

ORG: Ho, Huang, Hsueh, Chu, Liu of Institute of Parasitism, Chinese Academy of Medical Sciences; Yang, Chang, Fu of Shanghai Municipal Center for the Prevention and Control of Schistosomiasis

TITLE: "Cure of Tertiary Malaria in Children with 210 mg, 180 mg, and 120 mg of Primaquine During Latency"

SOURCE: Peking, Chung-hua Nei-k'o- Tsa-chih (Chinese Journal of Internal Medicine), Vol 12, No. 5, May 64, pp 407-410

ABSTRACT: Tertiary malaria has a wide distribution, and its elimination is an important problem. In foreign countries, the method of small doses and long duration of treatment is generally used for tertiary malaria. This method is not very effective for the tertiary malaria of the Southwest Pacific area, however, the rate of recurrence is as high as 30%. From October, 1961, to May, 1962, during a period of latency, a study was conducted with 210 mg of primaquine (divided into 7 days), 180 mg (divided into 80 days), and 120 mg (divided into 4 days). Other methods were used as control. The result showed that this method is the most satisfactory for tertiary malaria in children.

AUTHOR: HSIEH Shu-chen (6200/3219/6297)
WANG Chia-hui (3769/0857/3843)
HU Mei-sai (5170/7796/6357)
WENG Hsin-hua (5040/1800/5478)
TI Chih-p'ing (5049/3112/1627)
TAI Tzu-ying (2071/5261/5391)

ORG: Hsieh, Wang, Hu, Tai of Teaching and Research Group of Contagious Diseases, Shanghai First College of Medicine; Ti, Teaching and Research Group of Psychiatry, Shanghai First College of Medicine

TITLE: Certain Special Clinical Expressions of Tertiary Malaria

SOURCE: Peking, Chung-hua Nei-k'o- Tsa-chih (Chinese Journal of Internal Medicine), Vol 12, No 5, May 64, pp 411-414

ABSTRACT: Certain special clinical expressions such as coma, jaundice, and abdominal pain are frequently reported in malignant malaria, but seldom mentioned in tertiary malaria. Of the clinical data for tertiary malaria in the hospital of Shanghai First College of Medicine, there are some obvious symptoms of central nervous system, liver, lung, and kidney involvement. These symptoms, if not understood, may lead to mistakes in diagnosis. This paper reports these symptoms observed in 329 cases of adult tertiary malaria from January, 1958, to October, 1963.

AUTHOR: YANG, Ch'ing-chang (2799/1987/3864)
CHI Shih-jung (2621/1193/2837)
TSENG Sung-k'un (2582/2646/0981)
FU Yun-fang (0265/7301/5364)
WANG Jen-chen (3076/0088/3791)
HSU Ts'ui-fen (6079/5050/5358)

ORG: All of Shanghai Municipal Center for the Prevention and Treatment of Schistosomiasis

TITLE: A Preliminary Observation of the Effect of Cyclochin on Tertian Malaria in Shanghai

SOURCE: Peking, Chung-hua Nei-k'o Tsa-chih (Chinese Journal of Internal Medicine), Vol 12, No 5, May 64, pp 423-424

ABSTRACT: Cyclochin is the 4-choroquinum type antimalaria drug. It is not as easily accumulated as atebrin. Cyclochin is currently one of the common drugs for malaria in the Soviet Union. Its synthesis was accomplished by Shanghai Chung-hsi Pharmaceutical Plant in 1962. For the purpose of clarifying its effects as an antimalaria drug, the authors treated 34 children with tertian malaria in latency. Follow-ups in 10 weeks after the treatment was completed revealed protozons in 93.9% of the cases, but none of the patients developed malaria symptom during the period observed.

AUTHOR: None

ORG: None

TITLE: "Current Studies on Malaria"

SOURCE: Peking, Chung-hua Nei-k'o- Tsa-chih (Chinese Journal of Internal Medicine), Vol 12, No 5, May 64, pp 405-406

ABSTRACT: Great advancements have been made in studies on malaria in recent years. Through extensive surveys and large scale experimentation, the regional distribution of malaria is basically clarified. The species of mosquitoes, their ecological habits, and their relation to the prevalence of malaria are better understood. For the purpose of thorough elimination of malaria, the following key problems are listed in the paper as being in need of concentrated effort: 1. A permanent cure for tertiary malaria must be found. 2. The techniques of fluorescent antibody tracing and others, reported in foreign countries for determining the malaria antibody in the blood of inhabitants of an epidemic area, should be introduced and developed in this country. 3. Although chloroquinum, cyclochloroguanidum, pyrimethaminum, and primaquinum are all being mass produced in China and have become common antimalaria drugs, each has its defects and none is ideal. A more effective and safer drug remains an important problem for future study.

II. JAPANESE B ENCEPHALITIS

STUDIES ON THE PLAQUE-FORMING CHARACTERISTICS OF THREE STRAINS OF JAPANESE B ENCEPHALITIS VIRUS

Ch'en Po-ch'uan (7115/0130/2938), Hsu Chao-hsiang (6079/0340/4382), and Liu Yuan-yuan (2692/0337/0337). Wei sheng wu hsueh pao (Acta microbiologica sinica), v. 10, no. 3, 1964, 333-338.

The difference between plaque-forming titer and the mouse-brain LD_{50} titer, the plaque-forming rate, the rate of development of plaque, and the distribution of different plaque sizes of 3 strains (the A_2 strain, the chick embryo adapted A_2 strain and the Nakayama strain) of J. B. E. virus were studied. Concerning the rate of development in number and in size of the plaques formed by these strains during incubation, it was seen that the rate was evidently greater in A_2 strain than those observed in the other two. Finally, the possible reasons for the differences in p aque-forming characteristics and the relation of the plaque sizes to certain biological properties of these strains of J. B. E. virus, especially in respect to A_2 strain and the chick embryo adapted A_2 strain, were discussed.

ASSOCIATION: Chung-kuo i hsueh k'o hsueh yuan Ping tu hsueh yen chiu so (Virology institute, Chinese academy of medical sciences) [CR]

INTERFERON FORMATION IN CHICK EMBRYO

Ivanova, N. A. Interferon formation conditions in a chick embryo fibroblast tissue culture infected with Japanese B encephalitis virus. Byulleten' eksperimental'noy biologii i meditsiny, no. 2, 1966, 75-77.

Only biologically active Japanese B encephalitis virus induced interferon formation in a chick embryo fibroblast tissue culture monolayer. Interferon formed in infected chick fibroblast cells quickly passed into the surrounding

fluid medium and did not accumulate in the cells. Large doses of heat-inactivated virus did not induce interferon formation in the cells. Preliminary interferon treatment of tissue culture before infection decreased rather than increased fresh interferon production.

EXPERIMENTAL STUDIES ON ACTIVE IMMUNIZATION AGAINST JAPANESE B ENCEPHALITIS; II. THE RELATION BETWEEN THE INDEX OF PROTECTION IN MICE AND THE ROUTE OF CHALLENGE

Hsu Chao-hsiang (6079/0340/4382), Chou Ming-hsien (0719/2494/0341), and Ch'en Li-te. Wei sheng wu hsueh pao (Acta microbiologica sinica), v. 10, no. 1, 1964, 9-16.

In an attempt to explore the mechanism of immunization of the activated encephalitis B vaccine, the authors compared the protective effects of immunization by brain and subcutaneous inoculation. The relationship between protective action and antibody level was also studied. It was found that mice immunized only once acquired no or only a very weak protection against virus attack through the brain, but very strong protection against subcutaneous attack. Furthermore, protection against small amounts of subcutaneous virus was observed one or two days after immunization. Mice immunized twice acquired a very high protection against subcutaneous attack, and also some protection against brain attack. The protective index was related not only to the amount of vaccine, but also to the interval of injections. In general, lower protection was obtained by injection at shorter intervals than by injection at longer intervals. Protection by immunization persisted for a short time only, even though neutralizing antibodies in the blood stream persisted longer. The relation between the index of protection and the route of infection was also discussed.

ASSOCIATION: Chung-kuo i hsueh k'o hsueh yuan Ping tu hsueh hsi (Virology department, Chinese academy of medical sciences)
[CR]

STUDIES ON THE VARIATION OF PERIPHERAL PATHOGENICITY OF JAPANESE B ENCEPHALITIS IN WHITE MICE

Huang Chen-hsiang (7806/4394/4382). Wei sheng wu hsueh pao (Acta microbiologica sinica), v. 10, no. 1, 1964, 1-6.

Variation in the toxicity of Japanese B encephalitis virus was studied in mice of different ages. Both intracerebral and subcutaneous inoculation were used, with virus material in all cases taken from the brain. The virulence of virus subcultured intracerebrally decreases over successive generations when injected subcutaneously. Conversely, subcutaneous virulence does not decrease when transmission is by the subcutaneous route. Strains with already lowered virulence regain their virulence when once again transmitted subcutaneously. The incubation period and variation in the decrease of subcutaneous virulence in successive generations of virus transmitted via the intracerebral route were related to age, incubation periods being longer and variation smaller in young mice. It was concluded that there are three stages in virus virulence of cerebrally transmitted strains, a latent period, in which progressive decrease in virulence occurs, and a static period, during which the decrease in virulence becomes stabilized.

ASSOCIATION: Chung-kuo i hsueh k'o hsueh yuan Ping tu hsueh hsi (Virology department, Chinese academy of medical sciences)
[CR]

STUDIES ON INFECTIOUS RIBONUCLEIC ACID OF JAPANESE B ENCEPHALITIS VIRUS; IV. THE EFFECTS OF THE VIRUS WITH INFECTED RIBONUCLEIC ACID ON BRAIN TISSUE RIBONUCLEASE ACTIVITY IN THE MOUSE

Liu Yuan-yuan (2692/0337/0337), and Liu Hua-ch'en (2692/5363/2525). Wei sheng wu hsueh pao (Acta microbiologica sinica), v. 10, no. 1, 1964, 24-30.

Mice were infected with B encephalitis viruses with infective ribonucleic acid, and observations on the changes in ribonuclease activity in brain tissues were made. Ribonuclease activity in the brain tissues of in-

fected mice first increased and then decreased. Injection of virus ribonucleic acid or a large amount of virus material resulted in a more rapid increase in ribonuclease activity. Inoculation of small amounts of viruses caused a slow increase. When the multiplication of viruses in the infected mouse brain reached a certain degree, ribonuclease activity started to decrease. As virus concentration in the brain increased, ribonuclease activity continued to decrease until death, by which time it had fallen below the normal level. If a very small amount or sublethal dose of infective material was inoculated, some or all animals recovered easily within a short time and ribonuclease activity in the brain tissues returned to normal. On the basis of the experimental data, it is believed that the increase in ribonuclease activity in infected brain tissues may be the result of preliminary resistant action of cells against the infection. The decrease of ribonuclease activity in the later stages was probably due to intoxication and impairment of tissue mechanisms by the virus. The relationship between the formation of ribonuclease in cells and the low infectivity in virus ribonucleic acid was discussed.

ASSOCIATION: Chung-kuo i hsueh k'o hsueh yuan Ping tu hsi (Virology department, Chinese academy of medical sciences) [CR]

PRODUCTION OF AN INTERFERON-LIKE SUBSTANCE FROM CHICK EMBRYO CELL CULTURES INFECTED WITH JAPANESE B ENCEPHALITIS VIRUS

Mao Chiang-nen (3029/3068/2773), Hang Ch'ang-shou (2635/7022/1108), and Huang Chen-hsiang (7806/4394/4382). Wei sheng wu hsueh pao (Acta microbiologica sinica), v. 10, no. 3, 1964, 339-343.

An interfering substance with properties similar to interferon was demonstrated in Japanese B Encephalitis virus-infected chick embryo cell cultures. The titer of this substance, as estimated according to the plaque inhibition method with WEE as a challenge virus, varied from 1:32 to 1:128. The dynamics of its production from the infected cell cultures was studied. The results indicated that the maximum inhibitory activity was observed in the cell culture fluid at 48—72 hours after virus inoculation, which was later than the maximum titer of virus multiplication. The maintenance

level of the inhibiting substance in the infected cell was found to be related to the amount of virus inoculated. After the maximum titer of substance had been attained, some lowering of the level was observed when large doses of the virus were inoculated, while it showed no marked decrease for a period of 5 days when small inoculum was used. A comparison of the production of this substance between high (Peking strain) and low (Nakayama strain) peripheral pathogenic strains in cell cultures showed no difference in titer.

ASSOCIATION: Chung-kuo i hsueh k'o hsueh yuan Ping tu hsueh yen chiu so (Virology institute, Chinese academy of medical sciences) [CR]

DYNAMICS OF INTERFERON PRODUCTION IN CHICK EMBRYO CELL CULTURE INFECTED WITH INFECTIVE RNA OF JAPANESE B ENCEPHALITIS VIRUS

Mao Chiang-sen (3029/3068/2773), and Huang Chen-hsiang (7806/4394/4382).
Wei sheng wu hsueh pao (Acta microbiologica sinica), v. 11, no. 3, 1965, 326-329.

Infective RNA of Japanese B encephalitis virus, Peking strain, was extracted from infective mouse brain suspension by the cold phenol method. Dynamics of interferon production and virus multiplication in chick embryo cell culture after infection with infective viral RNA were compared with those infected with complete virus. The results indicate that the interferon production in the viral RNA infected group was always lower and appeared 24 hours later than those infected with complete virus during 120 hours observation. This difference holds true even when the infective dose of viral RNA used is 1 log higher than that of complete virus. No difference in the virus multiplication curve pattern was found between the 2 groups. A possible explanation of the above phenomenon was discussed.

ASSOCIATION: Chung-kuo i hsueh k'o hsueh yan Ping tu hsueh yen chiu so (Virology institute, Chinese academy of medical sciences) [CR]

ENHANCEMENT OF JAPANESE B ENCEPHALITIS VIRUS TITER

Mao, Chiang-sen, and Huang, Chen-hsiang. Enhancement of the virus titer of Japanese B encephalitis virus propagated in chick embryo cells by D_2O. Wei sheng wu hsueh pao (Acta microbiologica sinica), v. 12, no. 1, 1966, 24-28.

Japanese B encephalitis virus when grown in D_2O-treated cells was found to have a higher titer than the control. The difference was found to be greater in the heat-labile Nakayama strain than the more heat-stable Peking strain.

ELECTRON MICROSCOPIC STUDIES ON JAPANESE B ENCEPHALITIS IN TISSUE CULTURE CELLS

P'ang Ch'i-fang (7894/0366/2455), and Chang Li-pi (1728/4409/3880). Wei sheng wu hsueh pao (Acta microbiologica sinica), v. 10, no. 3, 1964, 294-301.

This paper reports electron microscopic observations concerning the development of JEV in chick embryo fibroblasts and hamster kidney cells. In the early stage of the infection, "dark cells" (cells with marked metabolic activities) appeared among the "bright cells" (cells with less metabolic activity). One of the most distinct changes of the infected cells in the moderate and advanced stages was the formation of "multiple vesicles" in all parts of the cytoplasm, accompanied by the appearance of JEV. The development of JEV could be seen in almost all parts, especially in the vacuoles and matrix substance of the cytoplasm, but not in the nucleus. JEV measured approximately 26-32mμ in diameter and appeared round in shape. No intracellular crystal formation could be found in the authors' studies. The release of JEV from the cells was found to be mainly through the vacuoles, which usually contained large numbers of virus particles. The relationship between JEV and the vesicles was discussed.

ASSOCIATION: Chung-kuo i hsueh k'o hsueh yuan Ping tu hsueh yen chiu so (Virology institute, Chinese academy of medical sciences) [CR]

CONCERTED CAMPAIGN AGAINST JAPANESE ENCEPHALITIS IN THE PRIMORSKIY KRAY (MARITIME TERRITORY)

Shestakov, V. I., A. I. Mikheyeva, I. N. Plenova, and V. S. Dorokhova. Zhurnal mikrobiologii, epidemiologii i immunobiologii, no. 5, 1960, 8-14.

An intensive campaign against endemic Japanese encephalitis in the Khasanak region of the Primorskiy Kray involving control of mosquito vectors and protection of the people from insect bites has been in progress since 1960. The tables show results of attempts to eliminate mosquitoes by spraying their breeding places with chemicals. Spraying in early spring produced the best results. Mosquito vectors of Japanese encephalitis in this region are: *C. tritaeniorhynchus G., C. bitaeniorhynchus G., C. pipiens L., A. togoi* and *A. esoensis, Jam.* Diethyltoluamide was the most effective mosquito repellent.

Table 1. Results of treating test reservoirs with a DDT aerosol

Time of treatment (in seconds)	DDT dose (in g/m³)	Beginning of kill after treatment (in hrs)	Kill (in %)		Recolonization after treatment (in days)
			Larvae	Pupae	
2	0.16	5	100	70	35–37
5	0.4	2–5	100	80	45–60
10	0.8	2–3	100	90–95	60–65

Table 2. Results of treating a test reservoir with 10% DDT dust

Amount of dust (kg/sq. hectare)	Time of start of kill (in hrs) after treatment		% kill after single treatment		Time in which re-colonization occurs (in months)	
	Larvae	Pupae	Larvae	Pupae	In stagnant water	In fast-flowing water
20–30	0.5–20	0	100	0	12	1–2½
40–50	0.5–24	18–72	100	50–60	17	4–5
60–70	0.5–21	30–50	100	80–95	—	11
100	0.5–12	21	100	100	-	15

Table 3. Results of spraying biotopes with a 2% aqueous solution of DDT paste

Time mosquitos are in contact with preparation (in hr)	Effect of treatment on various mosquito stages	No. of drops/cm² of area			
		In the center of the [illegible]	In remote areas		
		24–26	21.7	12.5	7.8
2–15	Larvae killed (in %)	100	100	100	100
24–96	Pupae Killed (in %) Surviving (in %)	82 18	70 30	61 36	30.4 69.6
	Imago: Killed by DDT on contact with surface of water (in²) Surviving (in²)	85 90 10 12	85 15	80 85 15 20	57.1 42.9

AUTHOR: Shestakov, V. I.; Mikheyeva, A. I.

ORG: Vladivostok Scientific Research Institute of Epidemiology, Microbiology, and Hygiene (Vladivostokskiy nauchno-issledovatel'skiy institut epidemiologii, mikrobiologii i gigiyeny); Primorskiy Kray Regional Sanitary-Epidemiological Station (Primorskaya krayevaya sanepidstantsiya)

TITLE: Study of Japanese encephalitis carriers in the Primorskiy Kray (Maritime Territory)

SOURCE: Meditsinskaya parazitologiya i parazitarnyye bolezni, v. 35, no. 5, 1966, 545-550

TOPIC TAGS: disease vector, animal disease, mosquito, virus disease, encephalitis

ABSTRACT: More than twenty mosquito species were identified in Japanese encephalitis foci in the Primorskiy Kray (both coastal and meadow regions) in 1957-1961. The potential vectors of Japanese encephalitis

among the identified species were: *Culex pipens* (5% of mosquito collection), *C. bitaeniorhynchus* (1%), *C. tritaeniorhynchus* (0.5%), *A. togoi* (78%), *A. koreicus* (1%), and *A. esoensis* (2%). The population of *C. tritaeniorhynchus*, the chief vector of Japanese encephalitis in meadow foci, has decreased 30—40 times in recent years due to elimination of rice fields. In the coastal area, the chief species attacking man was *A. togoi*, and in fishing villages, *A. togoi* and *Culex pipens*. In the meadow areas the following species commonly attacked man: *A. dorsalis*, *A. vexans nipponi*, *A. esoensis*, *Anopheles hyrcanus*, and sometimes *Culiseta silvestris amurensis*. Effective mosquito control consisted of treating ponds with insecticides (coastal regions) and aerial spraying (meadow foci). Orig. art. has: 1 table and 2 figures.

[W.A. 50]

Shestakov, V. I., and I. N. Polenova. Wintering places of bloodsucking mosquitoes in Japanese encephalitis foci in Primorskiy kray. Zoologicheskiy zhurnal, v. 44, no. 12, 1966, 1871-1873. AP7001071

Wintering places of adult *Culex* and *Anopheles* mosquitoes in Japanese encephalitis foci in the southern Primorskiy kray were studied in 1962—1963. Vegetable storehouses, inspection wells of water supply lines, caves, cellars, etc., with humidity levels of 80—100%, were most often chosen. Mosquitoes were found in hill sites 150 m above their breeding places. Mass flight of *Culex* mosquitoes to wintering sites occurred in late September--early October (mean temperature 9—16°C). Mean temperature in the wintering places rarely dropped below 0°C. In the spring *Anopheles hyrcanus* mosquitoes left the wintering sites first, in March. *Culex modestus* and *Culex pipiens* mosquitoes became active somewhat later, when the temperature inside the wintering places reached 8—10°C. Most mosquitoes had left the sites by late May--early June. The following species of mosquitoes were found in the wintering places: *Culex pipiens pipiens* (up to 90% of population), *C. vagans*, *C. modestus*, *C. apicalis*, *C. orientalis*, *C. bitaeniorhynchus*, and *Anopheles hyrcanus*.

UDC: 595.771 Culicidae:616.988.25-022.957(571.63)

STUDIES ON THE RELATIONSHIP BETWEEN THE DEGREE OF INACTIVATION OF JAPANESE B ENCEPHALITIS VIRUS AND THE PRODUCTION OF INTERFERON

Wang Shu-sheng (3769/2885/5116), and Huang Chen-hsiang (7806/4394/4382). Wei sheng wu hsueh pao (Acta microbiologica sinica), v. 10, no. 3, 1964, 363-368.

This paper deals with the studies of different methods and degree of inactivation of Japanese B encephalitis virus, Peking strain, on interferon production. Studies on the ability of different degrees of heat inactivated virus to interfere with the homologous virus multiplication also showed that complete inactivation of virus did not interfere with virus multiplication nor with the production of interferon. This further confirms the fact that complete inactivation of virus caused it to lose its power to elicit interferon production.

The fact that interferon is heat stable and Japanese B encephalitis virus can be completely inactivated at 56°C for 45—60 min, together with the finding that completely inactivated material does not influence the virus multiplication nor interferon production, suggest that such a simple method as inactivation may be preferable to the acid dialysis method usually employed for this purpose.

ASSOCIATION: Chung-kuo i hsueh k'o hsueh yuan Ping tu hsueh yen chiu so (Virology institute, Chinese academy of medical sciences) [CR]

EFFECT OF HIBERNATION ON THE COURSE OF JAPANESE B ENCEPHALITIS VIRUS INFECTION IN GROUND SQUIRRELS

Wang Yen-kuei (3769/3508/0311). Wei sheng wu hsueh pao (Acta microbiologica sinica), v. 11, no. 3, 1965, 330-334.

These experiments were carried out during winter with hibernating ground squirrels, *Citellus mongolicus ramosus* Thomas. Lethal doses of Japanese B encephalitis virus (Nakayama strain) were inoculated into the brain of soundly torpid squirrels and observations made during and after hibernation. None of the squirrels exhibited signs of illness and no deaths could be attributable to the virus infection

during 59 days of hibernation. Virus was found in the brain of individual squirrels from the seventh to the 44th day, and the LD_{50} titers (in mice per 0.03 ml intracerebrally) of the virus varied between $10^{-2.37}$ and $10^{-3.25}$. No virus was isolated from the liver or spleen. After the squirrels were brought to room temperature from the cold cabinet on the seventh to 59th day, all squirrels succumbed after one to three days. Japanese B encephalitis virus was isolated from the brain of these squirrels and LD_{50} reached values of $10^{-6.25}$ to $10^{-8.25}$. No virus was isolated from the liver and spleen.

ASSOCIATION: Shan-hsi i hsueh yuan Wei sheng wu hsueh chiao yen tsu (Microbiology research and teaching section, Shansi medical college)

[CR

JAPANESE B ENCEPHALITIS VACCINE PREPARED FROM MONOLAYER TISSUE CULTURE; 1. VIRUS CULTIVATION AND VACCINE PREPARATION

Wang Yung-chi (3769/3938/2813), Chou Ning-chen (0719/1380/3791), Ku P'ei-wei (7357/0160/7279), Sun Mien (1327/0517), Ma Wen-hsin (7456/2429/0207), Sun Shang-hao (1327/2141/6275), and Li Mei-jung (2621/5019/1369). *Wei sheng wu hsueh pao (Acta microbiologica sinica), v. 10, no. 1, 1964, 31-38.*

In 1958, the preparation of a B encephalitis vaccine was begun using chick embryo cells as a culture medium. By 1960, a considerable amount of encephalitis vaccine had been prepared and had begun to be used as a prophylactic agent for encephalitis in man. The authors investigated virus culture and preparation of vaccine. Both chick embryo and mouse brain strain of B encephalitis virus multiplied easily on single-layer chick embryo cells and could be serially passaged for many generations. The toxicity (LD_{50}) of serially passaged viruses did not increase. The growth curve pattern of various strains of the virus was studied and found to be identical with a maximum titer (LD_{50}) ranging from $10^{-5.0}$ to $10^{-6.0}$. Parallel titrations of the virus content both in infected cells and in the corresponding maintenance fluids gave comparable LD_{50} titers. A culture medium containing seven amino acids may be used as a substitute for No. 199 culture medium in culturing the viruses of B encephalitis. The toxicity of viruses obtained from the two culture media was almost the same, but varied at different culture intervals. In the seven amino acids culture medium, it attained its maximum concentration at 48 hours or somewhat later after inoculation. In No. 199

culture medium, however, it attained its maximum at about 36 hours. For preparing tissue culture vaccines, it is suggested to use mouse brain strain or chick embryo strain as the parent strain, and to maintain the culture temperature of cells and virus strains at 33-37C. When 0.1% formalin was added to the culture media, it was activated within a short time and maintained its antigenicity.

ASSOCIATION: Wei sheng pu Sheng wu chih p'in yen chiu so (Biological products institute, Ministry of public health) Wang Yung-chi, Ku P'ei-wei, Sun Mien, Chou Ning-chen and Li Mei-jung; Ch'eng-tu sheng wu chih p'in yen chiu so (Ch'eng-tu biological products institute) Ma Wen-hsin, and Sun Sheng-hao [CR]

TWO CASES OF SUCCESS IN CHICK EMBRYO ISOLATION OF B ENCEPHALITIS VIRUS FROM BLOOD

Wang Yung-chi (3769/3938/2813), and Li Mei-jung (2621/5019/1369). Wei sheng wu hsueh pao (Acta microbiologica sinica), v. 10, no. 1, 1964, 121-123.

Encephalitis viruses from the pathological materials of B encephalitis patients were isolated using chick embryo and mice. Among twenty-one blood samples, there were two positive cases. Two virus strains thus obtained were isolated successfully from the chick embryo but not from mice. From twenty-one spinal fluid samples, there was one positive case, and there were two positive cases from three brain tissue samples. All three positive cases were successfully isolated from the chick embryo and from the mouse and six virus strains obtained. The above eight virus strains have been proved to be B encephalitis viruses by means of the neutralization test, the complement fixation test, and the blood coagulation inhibiting test.

ASSOCIATION: Wei sheng pu Sheng wu chih p'in yen chiu so (Biological products institute, Ministry of public health) [CR]

III. MELIOIDOSIS

MELIOIDOSIS, 6=EXPERIMENTAL STUDIES SINO-SOVIET SPHERE, VIETNAM, JAPAN.
5=EXPERIMENTAL STUDIES, 4=HUMAN.

PATTERSON MC, DARLING CL, BLUMENTHAL JB
ACUTE MELIOIDOSIS IN A SOLDIER HOME FROM SOUTH VIETNAM.
JAMA 200:447-51, 8 MAY 67
ADULT, CASE REPORT (4), CEPHALOTHIN/ THERAPEUTIC USE,
*CHLORAMPHENICOL/ THERAPEUTIC USE, COLISTIN, CULTURE MEDIA, DRUG
RESISTANCE, MICROBIAL, FLUORESCENT ANTIBODY TECHNIC, GUINEA PIGS,
HUMAN (4), ISONIAZID/ THERAPEUTIC USE, LIVER/ PATHOLOGY, LUNG/
PATHOLOGY, MALE (4), MELIOIDOSIS/ DIAGNOSIS, *MELIOIDOSIS/ DRUG
THERAPY, *MELIOIDOSIS/ PATHOLOGY, *MILITARY MEDICINE,
PSEUDOMONAS/ ISOLATION & PURIFICATION, STEROIDS/ THERAPEUTIC USE,
*STREPTOMYCIN/ THERAPEUTIC USE, *TETRACYCLINE/ THERAPEUTIC USE,
THORACIC RADIOGRAPHY, UNITED STATES (1), VIETNAM (1)

ILERI SZ
THE INDIRECT HAEMAGGLUTINATION TEST IN THE DIAGNOSIS OF MELIOIDOSIS
IN GOATS.
BRIT VET J 121:164-70, APR 65
*GOATS, HEMAGGLUTINATION, *MELIOIDOSIS

NIGG C
SEROLOGIC STUDIES ON SUBCLINICAL MELIOIDOSIS.
J IMMUN 91:18-28, JUL 63
*COMPLEMENT FIXATION TESTS, EPIDEMIOLOGY, EXPERIMENTAL LAB STUDY
(4), *HEMAGGLUTINATION, *HEMAGGLUTINATION INHIBITION TESTS,
*MELIOIDOSIS, MONKEYS, PSEUDOMONAS, RABBITS, THAILAND (1)

OMAR AR
PATHOLOGY OF MELIOIDOSIS IN PIGS, GOATS AND A HORSE.
J COMP PATH THER 73:359-72, OCT 63
*GOATS, HISTOLOGICAL TECHNICS, *HORSE DISEASES, *MELIOIDOSIS,
PATHOLOGY, *SWINE DISEASES

RETNASABAPATHY A, JOSEPH PG
A CASE OF MELIOIDOSIS IN A MACAQUE MONKEY.
VET REC 79:72-3, 16 JUL 66
AGGLUTINATION TESTS, LUNG/ PATHOLOGY, MALAYSIA (1), MELIOIDOSIS/
DIAGNOSIS, *MELIOIDOSIS/ VETERINARY, *MONKEY DISEASES, MONKEYS

RETNASABAPATHY A
ISOLATION OF PSEUDOMONAS PSEUDOMALLEI FROM AN ABORTED GOAT FOETUS.
VET REC 79:166, 6 AUG 66
*ABORTION, VETERINARY/ MICROBIOLOGY, *GOATS, *MELIOIDOSIS/
VETERINARY, PREGNANCY, PREGNANCY, ANIMAL

4 BASCANDS J, RABIER M
(APPROPOS OF A CASE OF PLEUROPULMONARY MELIOIDOSIS) (FR)
MED TROP (MARSEILLE) 25:335-40, MAY-JUN 65
ADULT, CASE REPORT (4), HUMAN (4), *LUNG DISEASES/ ETIOLOGY, MALE (4), *MELIOIDOSIS, *PLEURISY/ ETIOLOGY

BIEGELEISEN JZ JR, MOSELEY H, CHERRY WB
A CASE OF HUMAN MELIOIDOSIS: CLINICAL, EPIDEMIOLOGICAL AND LABORATORY FINDINGS.
AMER J TROP MED 13:89-99, JAN 64
CULTURE MEDIA, ECLAMPSIA (1), EPIDEMIOLOGY, FLUORESCENT ANTIBODY TECHNIC, *MELIOIDOSIS, MICROSCOPY, FLUORESCENCE

BIEGELEISEN JZ JR, MOSELEY H, CHERRY WB
(CASE OF HUMAN MELIOIDOSIS, CLINICAL, EPIDEMIOLOGICAL AND LABORATORY FINDINGS) (SP)
REV ECLAT HIG 21:23-37, JAN-JUN 64
EPIDEMIOLOGY, *MELIOIDOSIS, PATHOLOGY

BORCHARDT KA, STANSIFER P, ALBANO PM
OSTEOMYELITIS DUE TO PSEUDOMONAS PSEUDOMALLEI.
JAMA 196:660-2, 16 MAY 66
ADULT, *ANTIBIOTICS/ THERAPEUTIC USE, CASE REPORT (4), HUMAN (4), MALE (4), *MELIOIDOSIS, *OSTEOMYELITIS, *PSEUDOMONAS INFECTIONS

COOPER EE
MELIOIDOSIS.
JAMA 200:452-3, 8 MAY 67
AMPICILLIN, CEPHALOSPORINS, *CHLORAMPHENICOL/ THERAPEUTIC USE, COLISTIN, DRUG RESISTANCE, MICROBIAL, HUMAN (4), *KANAMYCIN/ THERAPEUTIC USE, MELIOIDOSIS/ DIAGNOSIS, MELIOIDOSIS/ DRUG THERAPY, *MELIOIDOSIS/ OCCURRENCE, *NOVOBIOCIN/ THERAPEUTIC USE, PENICILLIN G, PENICILLIN RESISTANCE, STREPTOMYCIN, *SULFADIAZINE/ THERAPEUTIC USE, *TETRACYCLINE/ THERAPEUTIC USE

DUROUX A
(PULMONARY MELIOIDOSIS) (FR)
POUMON COEUR 21:355-72, 1965
*LUNG DISEASES, *MELIOIDOSIS

FOURNIER J
(MELIOIDOSIS AND THE WHITMORE BACILLUS, EPIDEMIOLOGICAL AND TAXONOMIC CONTROVERSIES) (FR)
BULL SOC PATH EXOT 58:753-65, JUL-AUG 65
ASIA, SOUTHEASTERN (1), HUMAN (4), *MELIOIDOSIS/ OCCURRENCE, *PSEUDOMONAS

GUILLERMAND J. BARRIE J. MORILLEAU R
(CHRONIC PULMONARY MELIOIDOSIS. (ANATOMO-CLINICAL CASE)) (FR)
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*CHLORTETRACYCLINE, DIAGNOSIS, DIFFERENTIAL, *LUNG
ABSCESS, *MELIOIDOSIS, *PENICILLIN, PNEUMONECTOMY,
*SULFAMETHOXYPYRIDAZINE, THORACIC INJURIES, THORACIC RADIOGRAPHY,
TUBERCULOSIS, PULMONARY, WOUNDS, GUNSHOT

JAMES AE, DIXON GF, JOHNSON HF
MELIOIDOSIS: A CORRELATION OF THE RADIOLOGIC AND PATHOLOGIC
FINDINGS.
RADIOLOGY 89:230-5, AUG 67
ADULT, CHLORAMPHENICOL/ THERAPEUTIC USE, HUMAN (4), KANAMYCIN/
THERAPEUTIC USE, MALE (4), MELIOIDOSIS/ DRUG THERAPY,
MELIOIDOSIS/ OCCURRENCE, *MELIOIDOSIS/ PATHOLOGY, *MELIOIDOSIS/
RADIOGRAPHY, NOVOBIOCIN/ THERAPEUTIC USE, THORACIC RADIOGRAPHY,
UNITED STATES (1), VIETNAM (1)

KETTERER PJ, RAMSDEN VM
A CASE OF MELIOIDOSIS IN LAMBS IN SOUTH WESTERN AUSTRALIA.
AUST VET J 43:79-80, MAR 67
*ABSCESS/ VETERINARY, AUSTRALIA (1), *MELIOIDOSIS/ OCCURRENCE,
*MELIOIDOSIS/ VETERINARY, PARALYSIS/ ETIOLOGY, *PARALYSIS/
VETERINARY, PSEUDOMONAS/ ISOLATION & PURIFICATION, *SHEEP
DISEASES/ OCCURRENCE, SPINAL CORD COMPRESSION/ VETERINARY,
*SPINAL DISEASES/ VETERINARY

MACGRAITH BG, LEITHEAD CS
MELIOIDOSIS: A CASE-REPORT.
LANCET 1:862-3, 15 APR 64
CHLORAMPHENICOL, DIAGNOSIS, DIFFERENTIAL, IRON METABOLISM, LIVER
FUNCTION TESTS, *MELIOIDOSIS, *SULFADIAZINE, TETRACYCLINE

MAGEE HR, MITCHELL RM, FITZWATER JJ
MELIOIDOSIS.
MED J AUST 1:1180-3, 10 JUN 67
ABSCESS/ MICROBIOLOGY, ADULT, CASE REPORT (4), *CHLORAMPHENICOL/
THERAPEUTIC USE, DIABETES MELLITUS/ COMPLICATIONS, DIAGNOSIS,
DIFFERENTIAL, DRAINAGE, DRUG RESISTANCE, MICROBIAL, FEMALE (4),
HUMAN (4), MALE (4), MELIOIDOSIS, MELIOIDOSIS/ COMPLICATIONS,
*MELIOIDOSIS/ DRUG THERAPY, *PSEUDOMONAS/ ISOLATION & PURIFICATION,
*SULFONAMIDES/ THERAPEUTIC USE, *TETRACYCLINE/ THERAPEUTIC USE

MARKELL EK
MELIOIDOSIS.
JAMA 201:490, 7 AUG 67
DIAGNOSIS, DIFFERENTIAL, *FEVER/ DIAGNOSIS, *MALARIA/ DIAGNOSIS,
*MELIOIDOSIS/ DIAGNOSIS, MILITARY MEDICINE, TROPICAL MEDICINE,
UNITED STATES (1), VIETNAM (1)

MONTGOMERY R
MELIOIDOSIS: REPORT OF A FATAL CASE IN A BRITISH SOLDIER.
J ROY ARMY MED CORPS 109:223-7, 1963
AUTOPSY, CAUCASIAN RACE, CHLORAMPHENICOL, MALAYSIA (1),
*MELIOIDOSIS, PENICILLIN

NELSON RA, ALBRIGHT CR
MELIOIDOSIS.
ORAL SURG 24:128-36, JUL 67
HUMAN (4), *MAXILLOFACIAL INJURIES/ COMPLICATIONS, *MELIOIDOSIS,
MILITARY DENTISTRY, REVIEW (4)

ROWLANDS JB, CURTIS EG
A CASE OF MELIOIDOSIS IN PAPUA AND NEW GUINEA.
MED J AUST 2:494-6, 19 SEP 65
ADULT, CASE REPORT (4), HUMAN (4), *LEPROSY/ COMPLICATIONS,
MALE (4), *MELIOIDOSIS, NEW GUINEA (1)

VAUGHAN EF
MELIOIDOSIS--A CASE REPORT.
AUST RADIOL 10:139, MAY 66
CASE REPORT (4), HUMAN (4), *LUMBAR VERTEBRAE, MALE (4),
*MELIOIDOSIS, MIDDLE AGE, RADIOGRAPHY

IV. VECTORS

MOSQUITO FOOD SOURCES IN THE LAKE ZAISAN--BLACK IRTYSH DELTA AREA

Anufriyeva, V. N., and A. A. Yagil'tsev. Food sources of bloodsucking mosquitoes in a focus of ARBO virus infections in the southeast part of the shore of Lake Zaisan and in the Black Irtysh delta (East Kazakhstan oblast, Kazakh SSSR). Meditsinskaya parazitologiya i parazitarnyye bolezni, v. 36, no. 1, 1967, 22-32. AP7007782

The food sources of bloodsucking mosquitoes were studied in the summers of 1963 and 1964 in the Zaisan region of East Kazakhstan oblast by the standard methods of analyzing the blood in mosquito stomachs and using baited traps. The following species of mosquitoes were most common in the area investigated: *Anopheles hyrcanus*, *A. maculipennis*, *Aedes caspius*, *Ae. vexans*, *Ae. flavescens*, *Culex modestus*, *C. pipiens*, and *Mansonia richiardii*. It was found that on the shore of Lake Zaisan and in the Black Irtysh delta area (including nearby populated areas), food sources for mosquitoes were cattle, horses, sheep, goats, people, and birds (chiefly migratory birds). Tests of the blood in 626 mosquito stomachs using the precipitation reaction showed that in uninhabited territory and around populated areas in the Black Irtysh delta and floodplain, mosquitoes fed more on wild birds (41%) than on cattle (17%), horses (13%), or humans (20%). In settlements, the chief source of food was cattle (50%). It is probable that the role of birds as mosquito hosts is even more important in wilderness areas. Use of traps containing muskrats or wild birds showed that the greatest number and variety of bloodsucking females were attracted to common pochards (*Authya ferina*), gadwalls (*Anas strepera*), red-necked grebes (*Podiceps griseigena*), carrion crows (*Corvus corone*), and moor buzzards (*Circus aeruginosus*). Tables with a detailed breakdown of the number of mosquitoes of each species in different areas or traps are provided. Traps fixed in the windows and chimneys of houses contained only *Anopheles hyrcanus* mosquitoes, although *A. maculipennis* and *Ae. caspius* also are known to invade houses in this area. The existence of a natural focus of ARBO viruses (equine encephalitis group) in this area was established by the presence of antibodies and viruses in the blood of six species of wild birds and

four species of bloodsucking mosquitoes, and by the demonstration of parasitic connections between mosquitoes and a number of wild bird species, humans, and agricultural animals.

UDC: 595.771-153+616.988.25-022.39](574.42)

ORG: Division of Insect Biology and Ecology, Entomological Department, Institute of Medical Parasitology and Tropical Medicine im. Ye. I. Martsinovskiy, Ministry of Public Health SSSR, Moscow (Otdeleniye biologii i ekologii nasekomykh entomologicheskogo otdela Instituta meditsinskoy parazitologii i tropicheskoy meditsiny Ministerstva zdravookhraneniya SSSR); Department of Virology, Kazakh Institute of Epidemiology, Microbiology, and Hygiene, Alma-Ata (Otdel virusologii Kazakhskogo instituta epidemiologii, mikrobiologii i gigiyeny) [JS]

MOSQUITO CONTROL IN CHINA

Ho, Ch'i (0149/3823). Recent progress in study of mosquito control in China. Chung-kuo k'un ch'ung hsueh hui erh shih chou nien hsueh shu t'ao lun hui hui k'an, 1966, 67-69.

AT6030759

The author reviews the progress of studies made on mosquito control in China since 1952, based on discussion at the Medical Insects Group. A total of 99 papers on medical insects were submitted, and only one paper, presented by Professor Li Hui-han (2621/6540/3352) of the Shantung Medical College (Shan-tung i hsueh yuan), was on mosquito control. This indicated that studies on mosquito control had not been adequate, although a nationwide insect control program was well underway. A 1960--1961 study by Li Hui-han and Sun Wen-hsiu (1327/2429/0208) of the Shantung Province Parasitic Disease Control Institute (Shan-tung chi sheng ch'ung ping fang chih so) showed that *Culex pipiens pallens* in Tsouhsien, Shantung had been controlled with DDT and benzene hexachloride. *Anopheles minus* was controlled in South China, particularly on Hainan in 1963. Control of *Anopheles hyra-*

canus sinensis and *Anopheles ludlowii* began in the Ch'ing-p'u County near Shanghai under the supervision of the East China Entomology Institute (Hua-tung k'un ch'ung yen chiu so) and in Wu-hsing County, Chekiang, under the auspices of the Parasitology Institute of the Chinese Academy of Medical Sciences (Chung-kuo i hsueh k'o hsueh yuan Chi sheng ch'ung ping yen chiu so). Preliminary results were to be available at the end of 1966. Since paddy borers and *Anopheles* species are bred in rice fields, the author proposes that study must be made in order to develop an effective method for simultaneous control of both insects.

ORG: Medical Insects Group (I hsueh k'un ch'ung tsu) [PY]

MITES AND TICKS OF THE SUBTROPICAL ZONE IN ABKHAZ ASSR (ACARINA, TYROGLYPHOIDEA)

Kadzhaya, G. Sh. IN: Akademiya nauk Gruzinskoy SSR, Soobshcheniya, v. 39, no. 1, 1965, 191-196.

Twenty-five species of Acarina and Tyroglyphoidea comprising ± 45% of the species of the Georgian SSR and 20% of SSSR fauna were found in the subtropical zone of Abkhaz ASSR during a study conducted mainly in 1961-62. This pest population is serious to agriculture and horticulture. Species registered in Abkhaz SSR are classified as follows: family Tyroglyphoidae, 10 genera and 16 species; family Saproglyphoidae, 2 genera and 2 species; family Glycyphagidae, 4 genera and 7 species. They are divided into 2 groups according to their adaptation to specific habitats: the synanthropic forms include 13 species found mainly in grain and seeds, tobacco, tea, bulbs, tubers, fruits, cellars of storehouses and granaries, and in wet debris in storehouses, mills, and wine barrels. The field forms include 12 species found in natural surroundings: forest floor, plant refuse, decomposing wood, leaves, and ant hills. The synanthropic population was heaviest where optimal moisture

conditions were maintained. Thus, several thousands of Aleuroglyphus ovatus were found per 150-200 ml of flour residues from a water-powered mill. The population density of the field form depended on moisture conditions and on food supply, hay stacks being most heavily infested.

ASSOCIATION: Akademiya nauk, Gruzinskoy SSR, Institut zoologii (Academy of Sciences, Georgian SSR, Institute of Zoology)
[DP]

ZOOLOGICAL FACTORS IN THE EXISTENCE OF SEVERAL NATURAL TULAREMIA FOCI

Kucheruk, V. V., I. L. Kulik, N. A. Nikitina, P. A. Panteleyev, M. A. Rubina, and E. V. Tupikova. Zhurnal mikrobiologii, epidemiologii i immunobiologii, no. 6, 1965, 80-86.

A July 1956 outbreak of tularemia among water rats (Arvicola terrestris L.) living along a brook in the Altai foothills (Krasnogorsk Rayon) was described. Affected animals constituted 27% of the water rat population of the section of the brook where the epizootic occurred and 12% of the total rat population of the brook. The vector was the Ixodes tick which in its larval and nymphal stages parasitized chiefly the adult animals. Water was a less common source of infection, for after removal of the sick rats, no other animals became diseased although the brook remained infected. The epizootic was confined to the summer, coinciding with the period of mass infestation of Ixodes nymphs. It was also concentrated within a small area. Epizootics in the subalpine brook foci do not spread too far because the individual brook populations have little contact with each other during the summer. All the tularemia foci of the floodplain and subalpine brook types studied shared the following characteristics: the water rat is the universal source of infection, while Ixodes ticks serve as a reservoir of the pathogen during the periods between epizootics;

the epizootics occur during periods of peak infestation by the tick nymphs.

ASSOCIATION: Institut epidemiologii i mikrobiologii im. N. F. Gamalei AMN SSSR (Gamaleya Institute of Epidemiology and Microbiology AMN SSSR) [DP]

MOSQUITOES IN ROCKY AREAS OF THE ILI RIVER BASIN

Isimbekov, Zh. M. IN: Akademiya nauk Kazakhskoy SSR. Izvestiya. no.3, 1966, 71-76.

Mosquitoes are the main component of the blood-sucking insect population of the Ili river basin. Collections were made from May to September 1963 as part of a larger study of virus-carrying insects. At the time of the study no investigation for infection of mosquitoes was carried out because the aim of the study was ecological rather than epidemiological since little was known about species composition and habitat of these insects in this area. The collection area was varied, with clear vertical zonation in ecological areas ranging from desert to forest. Fourteen species and one subspecies were collected from heights between 2000 and 2700 m above sea level. The table shows results of collections.

Table 1. Species Composition and Relative Number of Mosquitoes in Rocky Areas of the Ili River Basin

Species	Number of insects captured			Catch data		
	Absolute number		%	1 st	Height of Concentration	Second
	Female	Males				
Anopheles bifurcatus L.	1	—	0,02	17.VI	—	—
An. maculipennis Mg.	8	—	0,5	21.VI	—	13.VIII
Culiseta alaskaensis Ludl.	43	26	2,0	25.V	—	4.IX
Aedes caspius Pal.	15	—	0,4	2.VII	—	30.VIII
Ae. dorsalis Mg.	2716	189	80 0	18.V	10.VI —30.VIII	7.IX
Ae. flavescens Muli.	80	5	2,5	19.V	2.VII—30.VIII	4.IX
Ae. cataphylla Dyar.	53	4	1,6	18.V	4.VI —25.VI	24.VII
Ae. leucomelas Mg.	90	3	3,0	18.V	10.VI —10.VII	16.VIII
Ae. intrudens Dyar.	185	—	5,2	17.V	19.V — 3.VI	4.VII
Ae. vexans vexans Mg.	14	1	0,4	4.VII	—	14.VIII
Ae. vexans nipponi Theo.	4	—	0,1	20.VI	—	14.VIII
Ae. cinereus Mg.	81	1	2,3	18.VI	9.VII—10.VIII	16.VIII
Culex modestus Pic.	32	2	0,8	18.V	—	4.IX
C. exilis Dyar.	—	2	0,05	18.V	—	3.IX
C. pipiens L.	26	32	1,6	24.VII	—	3.IX
Total	3248	315	100	17.V	19.V—30.VIII	7.IX

ASSOCIATION: Institut zoologii AN KazSSR (Institute of Zoology, Academy of Sciences Kazakh SSR) #10,42-43

[LP]

MEDICAL INSECT CULTURE

Lu, Pao-lin (7120/1405/7792). Chung-kuo k'un ch'ung hsueh hui erh shih chou nien hsueh shu t'ao lun hui hui k'an, 1966, 50-51. AT6030754

The author reviews the progress and discusses major problems in medical insect culture. Problems encountered in development of insect strains in laboratories include difficulties

in mating and ovary development, overcome by Prof. Ho Ch'i (0149/3823) in fertilization of Chinese mosquitoes (*A. sinensis*) by forced mating; conditions for oviposition, including the prevention of retardation in growth and hatching by the use of fermented culture media to stimulate hatching by Hu Neng (5170/5174) in 1963; and homogeneity of insect quality, with emphasis on control of culture conditions and population densities to increase breeding efficiency. The author urges extensive studies in order to keep abreast of foreign developments in insect culture. This paper was prepared during discussion by the Insect Bionomics Group on 14 July.

ORG: Insect Bionomics Group (K'un ch'ung sheng t'ai tsu) [PY]

CONTROL OF BITING INSECTS

Mirzayeva, A. G. Conference on the problem of control of bloodsucking insects. AN SSSR. Sibirskoye otdeleniye. Izvestiya. Seriya biologo-meditsinskikh nauk, no. 2, 1966, 147.

From 25 to 28 January 1966 a meeting was held in Novosibirsk at the Biological Institute of the Siberian Branch of the Soviet Academy of Sciences on control of bloodsucking insects. One hundred and fifty representatives of 69 organizations heard 42 papers. The conference emphasized the biological basis of control of these pests. A number of papers were devoted to the ecology of bloodsucking insects in various regions of the Soviet Union, and related subjects. It was noted that when cattle are massively infested with these pests, milk production declines by 11.5%, and weight gain in calves, by 34%. The results of testing new insecticides and repellents were presented. The most effective was found to be diethyltoluamide. Good results were also obtained with benzimine. The use of protective clothing was discussed, as was the application of aerosols. Areas for further investigation were pointed out, and, in

conclusion, the following recommendations were made: developing the production of possible insecticides, establishing a system of territorial stations for pest control, and further study of the newest methods of controlling these pests. [KL]

AUTHOR: Modal', Kh. M.; Mishayeva, N. P.

ORG: Belorussian Scientific Research Institute of Epidemiology and Microbiology, Minsk (Belorusskiy nauchno-issledovatel'skiy institut epidemiologii i mikrobiologii)

TITLE: Studies of the fauna and ecology of bloodsucking mosquitoes in the Gomel' oblast of the Byelorussian SSR

SOURCE: Meditsinskaya parazitologiya i parazitarnyye bolezni, v. 35, no. 5, 1966, 607-609

TOPIC TAGS: animal disease, disease vector, mosquito, population study

ABSTRACT: Twenty species of mosquitoes were identified in the Svetlogorsk rayon, including 18 bloodsucking species (subfamily *Culicinae*) belonging to the genera *Anopheles*, *Aedes*, *Culex*, and *Theobaldia*, and two non-bloodsucking species (subfamily *Chaoborinae*) belonging to the genera *Chaoborus* and *Mochlonyx*. The most numerous and widespread species of bloodsucking mosquitoes were *Aedes communis*, *Aedes excrucians*, *Aedes punctor*, and *Aedes maculatus*. The chief breeding places for Aedes mosquitoes were forest and meadow bogs, sinkholes, trenches, and ditches. The seasonal population of Aedes mosquitoes (late April to early September) varied depending on the biotope. The average number of mosquitoes collected in 10 minutes was highest in areas of nettle and Spiraea (meadowsweet, etc.) growths. Orig. art. has: 1 figure. [W.A. 50]

MOSQUITOES IN THE KRASNODAR REGION

Morozov, V. A. Meditsinskaya parazitologiya i parazitarnyye bolezni, v. 35, no. 3, 1966, 371-372.

Aedes rusticus was first observed in the Soviet Union in the Krasnodar region in 1956. Since then, after a cold winter, the insect appears in the early spring and is most common in lightly wooded areas.

ASSOCIATION: Krasnodarskaya krayevaya sanepidstantsiya (Krasnodar Regional Health Station) [LP]

AUTHOR: Morozov, V. A.

ORG: Krasnodar Regional Health Station (Krasnodarskaya krayevaya sanepidstantsiya)

TITLE: Mosquitoes in the Krasnodar region

SOURCE: Meditsinskaya parazitologiya i parazitarnyye bolezni, v. 35, no. 3, 1966, 371-372

TOPIC TAGS: biology, ecology, insect, [redacted], mosquito

ABSTRACT:

Aedes rusticus was first observed in the Soviet Union in the Krasnodar region in 1956. Since then, after a cold winter, the insect appears in the early spring and is most common in lightly wooded areas.

SIMULIIDAE OF THE LOWER KAN RIVER

Murav'yeva, T. V. Simuliidae of the lower Kan River in the Krasnoyarsk region. Meditsinskaya parazitologiya i parazitarnyye bolezni, no. 1, 1966, 15-19.

In this area 25 species of simuliidae imagos and larvae were found. During the entire season, 99.2% of adults consisted of *Simulium galeratum, S. morsitans longipalpe, Gnus jacuticum* and *Gnus cholodkovski*. The Kan River and the Rybnaya, its largest tributary, are the main breeding places of these bloodsucking black flies. Water temperature is the most important factor determining simuliidae species composition in streams while current speed mainly influences habitat distribution of larvae in the river. *P. alpestre, P. tridentatum, E. longipalpe, E. bicorne,* and *E. shevjakovi* preferred stony bottom areas with a temperature no higher than 10°C. Only one species, *E. aureum,* was collected where current speed was less than 0.5 m/sec.

ASSOCIATION: Otdeleniye biologii i ekologii nasekomykh instituta meditsinskoy parazitologii i tropicheskoy meditsiny im. Ye. I. Martsinovskogo Ministerstva zdravookhraneniya SSSR, Moskva (Insect Biology and Ecology Section, Institute of Medical Parasitology and Tropical Medicine, Ministry of Health SSSR) [LP]

MOSQUITOES IN THE VICINITY OF NORILSK

Polyakova, P. Ye. IN: Sibirskoe otdeleniye Akademii nauk SSSR. Izvestiya, v. 4, no. 1, 1966, 151-153.

Data resulting from collections of flies made in 1963 in the vicinity of Norilsk are summarized in Table 1. As shown, the Talnakh community is dominated by *A. communis* and in Labytnanga, *A. excrucians, A. punctor* and *A. hexodontus* predominate. As shown by Figs. 1 and 2, the mosquito population reaches a peak in July and the mosquitoes themselves are most active during the night hours.

Table 1. Species composition and numerical relation of flies in the vicinity of Talnakh and Labytnanga (according to data collected from 1960—1964)[1]

Species	Catches					
	Talnakh			Labytnanga		
	Larvae	Females	Males	Larvae	Females	Males
Aedes hexodontus Dyar.	267	4510	59	1536	2317	18
A. punctor Kirby.	26	187		1177	934	
A. communis Deg.	2099	182	76	61	55	
A. pullatus Coq.	1	38		2	12	
A. intrudens Dyar.		1		2	4	
A. dianlueus H. D. K.		59				
A. impiger Walk.	3		1	3		
A. pionips Dyar.		19		2	2	
A. cinereus Mg.	40	3	3	17	6	
A. excrucians Walk.	2	3	1	4316	1989	24
Culiseta alaskaensis Ludl.		182		12	28	
Total	2438	5184	139	7118	5347	42

[1] *A. nigripes* and *C. bergrothi* are not included in the table.

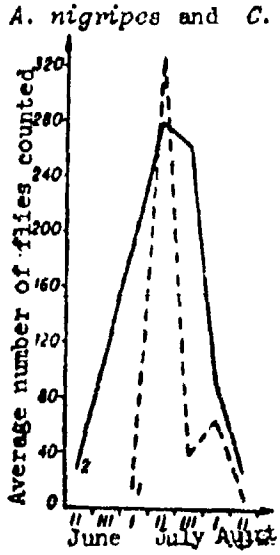

Fig. 1. Seasonal increase in numbers of mosquitoes in the Norilsk area

1 - 3-minute count; 2 - 20-minute count.

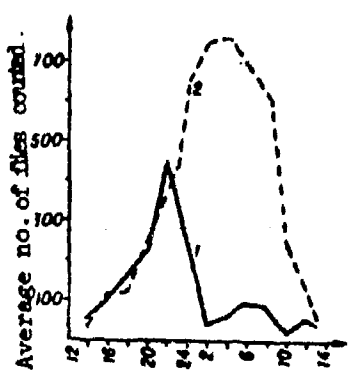

Fig. 2. Daily activity of mosquitoes in the Talnakh and Labytnanga areas

1 - 3-minute count; 2 - 20-minute count.

MOSQUITOES IN TOMSK OBLAST

Polyakova, P. Ye., and S. I. Bobrova. Fauna and ecology of blood-sucking mosquitoes (Diptera, Culicinae) in the southern part of Tomsk oblast. Zoologicheskiy zhurnal, v. 44, no. 10, 1965, 1571-1573.

Twenty-three species of mosquitoes were identified in the southern part of Tomsk oblast (Western Siberia) in May-September, 1962. (See Table 1). Collections were made in

Table 1. Species composition of mosquitoes in southern Tomsk oblast (1962)

Species	Number caught			
	Larval	♂♂	♀♀	Total
1. Anopheles maculipennis Mg.	9	3	2	13
2. Culiseta alaskaensis Ludl.	—	—	2	2
3. C. ochroptera Peus.	4	—	—	4
4. Aedes caspius dorsalis Mg.	—	—	—	—
5. Ae. punctor Kirby	70	13	5360	5440
6. Ae. communis D.g.	92	12	6450	6554
7. Ae. diantaeus H. D. K.	60	18	1059	1137
8. Ae. intrudens Dyar	6	4	154	164
9. Ae. hexodontus Dyar	12	—	8	20
10. Ae. pullatus Coq.	—	—	5	5
11. Ae. cataphylla Dyar	—	—	51	51
12. Ae. excrucians Walk.	11	26	46	83
13. Ae. cantans Mg.	17	0	232	249
14. Ae. riparius D. K.	—	1	—	1
15. Ae. flavescens Müll.	—	4	—	4
16. Ae. beklemishevi Den.	122	—	—	122
17. Ae. cinereus Mg.	11	2	71	84
18. Ae. rossicus D. G. M.	—	—	—	—
19. Ae. vexans Mg.	—	—	14	14
20. Culex modestus Fic	17	—	—	17
21. C. apicalis Adams.	30	—	—	30
22. C. pipiens L.	2	—	—	2
23. Mansonia richiardii Fic.	—	—	63	63
Total	462	83	13533	14078

pine forests along the Ob' River. Maximum numbers of mosquitoes were recorded from late May to mid-July. Peak populations varied with the species, however. *Aedes communis* was most numerous in early June and *Aedes punctor* in late June: *Aedes communis* mosquitoes made up 48.0% of the population, and *Aedes punctor* 40.0%. Mosquitoes were most active in the morning and evening hours. It was established that the most favorable temperatures for mosquito activity are between 20°C and 25°C.

MOSQUITO ECOLOGY IN THE TOMSK REGION

Polyakova, P. Ye., and A. G. Mirsayeva. Meditsinskaya parazitologiya i parazitarnyye bolezni, no. 1, 1966, 35-38.

In 1960, 7624 female mosquitoes from the Asino district of the Tomsk region were captured and examined, and 14 species were found, dominated by *Aedes punctor, Ae. communis* and *Ae. cinereus*. Phenology and percentage ratios of individual species, and effects of temperature and light on flight activity were studied in order to plan mosquito control in Western Siberia.

ASSOCIATION: Laboratoriya parazitologii Biologicheskogo instituta SO AN SSSR, Novosibirsk (Parasitology Laboratory, Biological Institute, SO AN SSSR) [LP]

DIPTERA IN THE ANGARA RIVER DISTRICT

Rasnitsin, S. P., S. I. Makarova, and G. A. Sheveleva. Distribution of Diptera, Simuliidae in streams of the Angara River District. Meditsinskaya parazitologiya i parazitarnyye bolezni, no. 1, 1966, 3-5.

In streams of the Angara River District water temperature is the main influence on the distribution of blackfly larvae. Where the water temperature is 3—10°C *Prosimulium alpestre* predominate; from 11—16°, *Simulium vulgare;* at 21° and above, *Eusimilium aureum, E. Latipes* and *Hellichia baffinensis. P. alpestre, S. vulgare,* and *Cnephia edwardsiana* are most numerous. In streams, bloodsucking species seldom occur both in the larval and imago stages and have little practical importance.

ASSOCIATION: Otdeleniye biologii i ekologii nasekomykh Entomologicheskogo otdela Instituta meditsinskoy parazitologii i tropicheskoy meditsiny im. Ye. I. Martsinov-

skogo Ministerstvo zdravookhraneniya SSSR, Moskva (Insect Biology and Ecology Section, Entomology Department, Institute of Medical Parasitology and Tropical Medicine, Ministry of Health SSSR) CDE #6,37 [LP]

BLOODSUCKING DIPTERA IN THE CHERNIZOV REGION OF THE UKRAINE

Shevchenko, A. K. Meditsinskaya parazitologiya i parazitarnyye bolezni, no. 1, 1966, 28-32.

Forty-nine Dipteran species falling into three families were found in the middle part of the Desna River in the Chernizov region. Species composition, breeding places, and seasonal prevalence were studied. Anopheles breeds near the shores of the Seyma and Ubed Rivers. The greatest numbers were found in the Ubed delta. In spring *Sch. maculipennis* are found principally near the Desna and Seyma. Culicidae were found in greatest numbers in the middle of June in quiet waters and in cisterns. Many Aedes species inhabit peat bogs and swamps. In spring *Aedes behningi* and *Ae. intrudens* were prevalent; in early summer, *Ae. excrucians*—in damper places *Ae. maculatus* and *Ae. flavescens*; in July, *Ae. dianteus* and *Ae. cinereus*; and in August, *Ae. communis*. The land and climate conditions of this area are favorable to this type of insect.

ASSOCIATION: Naucho-issledovatel'skiy institut biologii Khar'kovskogo gosudarstvennogo universiteta im. Gorkogo (Biological Research Institute, Kharkov State University) [LP]

FORECAST OF CHANGES IN THE BLOOD SUCKING INSECT POPULATION [illegible] AT ILI RIVER RESERVOIR

Forecast of components of the blood sucking insect population in the Kapchagayskiy reservoir area

Kamshilov, M. M., and A. M. Dubitskiy. AN KazSSR. Vestnik, no. 1, 1967, 72-73. AP7007179

A forecast of anticipated changes in the population of bloodsucking insects (biting midges, horseflies, mosquitoes, and gnats) when the Kapchagayskiy reservoir is completed is discussed. This desert basin of the Ili River is densely populated with a total of 79 species of bloodsucking insects. The insect population is expected to decrease below the dam as overflow reservoirs dry up and periodic flooding ceases. The population of *Aedes* mosquitoes in this area will drop sharply. Above the dam, the insect population will drop sharply in the first year but recover in 3--4 years, depending on the time of year and rate of filling of the reservoir. *Culex*, *Anopheles*, and *Culiseta* mosquitoes and common species of horseflies and biting midges should find numerous good breeding places around the new reservoir, especially in the shallow waters at the southern end. However, the new conditions will be unfavorable for the malaria mosquitoes *Anopheles maculipennis* and *Anopheles hyrcanus*, especially in the western and northern areas of the reservoir. There is a potential hazard of leishmaniasis if future settlements are created on the relatively pest-free northwest shore of the reservoir, since this area adjoins a natural habitat of sandflies and gerbils. Appropriate measures must be taken in the first year of existence of the reservoir to keep the population of bloodsucking insects under control. [JS]

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TITLE: Methods of detecting AEDES mosquito eggs in soil

SOURCE: Meditsinskaya parazitologiya i parazitarnyye bolezni, v. 35, no. 5, 1966, 615-617

TOPIC TAGS: insect, insect control, ~~Aedes~~ mosquito, soil

ABSTRACT: Soil samples were taken from the Northern Donets River and Lower Don (Rostov oblast) flood plains in September-October, before the autumn rains, and were examined for eggs of six *Aedes* species (*Ae. caspius*, *Ae. vexans*, *Ae. cinereus*, *Ae. kehningi*, *Ae. flavescens*, and *Ae. excrucians*). During laboratory examination, air temperature was 24.5—26.5°C, and water temperature, 19—21.5°C. Multiple rehydration and drying of soil specimens showed that mass emergence from diapause in *Aedes* mosquitoes was in February in the steppe zone. In analysis of the soil specimens, hatched larvae were counted, and species was determined for those reaching age III—IV. The number of hatched larvae of a given species served as an index of soil infestation with that species. Orig art. has: 1 figure

PROTECTION OF DOMESTIC ANIMALS AGAINST BLOOD-SUCKING INSECTS

Teivunin, V. S., I. A. Zakamyrdin, V. V. Kormachov, and G. Kh. Kamay. Class 45, No. 188213, Izobreteniya, promyshlennyye obraztsy, tovarnyye znaki, no. 21, 1966, 181.
AP7001443

Aqueous emulsions of insecticides are usually applied to the skin of domestic animals to protect them against blood-sucking insects (e.g., mosquitos). To increase the effectiveness and to decrease the toxicity of the insecticides, in the proposed method, diethylmercapto-n-butylmethylpho - phine thioxide is used as the insecticide.

UDC: 632.952.2

ORG: Kazan Chemical Technology Institute im. S. M. Kirov (Kazanskiy khimiko-tekhnologicheskiy institut) [PS]

EFFECT OF VOLGOGRAD RESERVOIR CONDITIONS ON BREEDING OF MOSQUITOES

Viktorov, V. F. The effect of hydrological conditions at the Volgograd reservoir on breeding of bloodsucking mosquitoes in the Volga floodplain. Meditsinskaya parazitologiya i parazitarnyye bolezni, v. 36, no. 1, 1967, 17-22.
AP7007781

The effect on the mosquito population of changing hydrological conditions in the Volga floodplain of Saratov oblast due to creation of the Volgograd reservoir was studied in 1961—1964. Seasonal fluctuations in the mosquito population are determined to a large extent by the amount of water consumed by the Volgograd and Kuybyshev hydroelectric power stations. In the completely flooded lower part of the reservoir, of course, mass breeding of mosquitoes does not occur. In the Saratov-Engels area, most favorable conditions for the development of *Aedes* mosquitoes are created in years of moderate floods in early spring, followed by considerable variations in the water level in spring and summer (as occurred in 1961 and 1962). Under these conditions, mass flights of mosquitoes occur in late May and again in late June. In the Marx-Volsk wooded floodplain, high floods covering large areas with shallow water promote mass breeding of mosquitoes (as in 1960). In the Balakovo-Khvalynsk floodplain, also, higher floods create larger breeding areas (as in 1963). The species composition of mosquitoes in the Engels area is approximately: 63—75% *Aedes vexans*, 11% *A. cantans*, 13% *A. excrucians*, 14% *A. caspius* and *A. dorsalis* and a few examples of *A. geniculatus*, *A. flavescens*, *A. cyprius*, *A. cataphylla*, *A. pulchritarsis*, *A. detritus*, and *A. leucomelas*. Mass breeding of *Culex modestus* in favorable conditions occurs in July and August. The population of *Anopheles maculipennis* around Saratov-Engels has dropped considerably since the creation of the reservoir. Control of *Aedes* mosquitoes in this area is best attempted when larvae are developing in late April and early May.

ORG: Saratov Regional Sanitary-Epidemiological Station (Saratovskaya oblastnaya sanepidstantsiya) [JS]

INSECTICIDE TRIALS ON PREIMAGINAL AND IMAGINAL *AEDES* MOSQUITOES

Vinogradskaya, O. N. Tests of insecticides on preimaginal and imaginal stages of Aedes mosquitoes. Meditsinskaya parazitologiya i parazitarnyye bolezni, v. 36, no. 1, 1967, 54-60. AP7007784

Laboratory tests of four organophosphorus insecticides were conducted with preimaginal *Aedes* mosquitoes in water from natural biotopes (swamps adjoining the Ob in Tyumen oblast) under temperature conditions simulating the natural environment. Adult mosquitoes were also tested with lindane. Experiments showed that methylnitrophos (0,0-dimethyl 0-3-methyl-4-nitrophenyl thiophosphate) and trichlormetaphos-3 (0-methyl 0-ethyl 0-2,4,5-trichlorophenyl thiophosphate) were most toxic for *Aedes* larvae. The minimum dose of methylnitrophos causing 100% mortality of first- and second-stage larvae was 0.001—0.002 g of commercial preparation per m^2, or 0.016 g/m^2 for larvae of stages III and IV, or 0.7 g/m^2 for pupae. For trichlormetaphos-3, the minimum doses were 0.0032 g/m^2 for first- and second-stage larvae, 0.032 g/m^2 for third- and fourth-stage larvae, and 4 g/m^2 for pupae. DDVP and methylacetophos (0-dimethyl S-carbethoxymethyl thiophosphate) were less effective against larvae. The doses for larval stages should be considered approximate, since the insecticidal activity of organophosphorus compounds in water varies with the temperature and pH of the medium, the character of bottom sediment, the vegetation, and other factors. For adult *Aedes* mosquitoes, the most toxic preparations were DDVP (0,0-dimethyl 0-2,2-dichlorvinyl phosphate) with a minimum dose causing 100% mortality of 0.0007 g/m^2, and 10% lindane dust, with a minimum dose of approximately 0.005 g/m^2. Smaller doses of insecticides were effective for smaller mosquitoes. All the above doses must be verified under natural conditions.

UDC: 615.777.25-07:614.449.577.1

ORG: Central Scientific Research Disinfection Institute, Moscow (Tsentral'nyy nauchno-issledovatel'skiy institut dezinfektsii) [JS]

Vladimirova, V. V. Experience of mass breeding of Aedes aegypti *L. Meditsinskaya parazitologiya i parazitarnyye bolezni, v. 35, no. 6, 1966, 719-723.* AP7001494

A method of mass breeding of *Aedes aegypti* mosquitoes using wall cabinets with special tanks for raising larvae was described. This method, which can produce 2000—3000 mosquitoes in three to six days, has been in use since 1962. Good results are obtained with infusions of guinea pig excrement and brewer's yeast in the larval tanks. The infusion is partially replenished each week, and completely every two to three months. Temperature in the cabinets is kept at 26—28C, and humidity at 70—80%. Adult mosquitoes intended for insecticide testing are kept in breeding places with tanks containing cotton moistened with glucose. Mosquitoes destined for egg-laying are allowed in addition to feed on guinea pigs or mice for three to four hr a day. This method of mass breeding of mosquitoes requires minimal time and attention, since larvae are automatically fed into tanks, and imagos fly out of the tanks into the breeding places. UDC: 595.771.082

ORG: Institute of Medical Parasitology and Tropical Medicine im. Ye. I. Martsinovskiy, Ministry of Public Health SSSR, Moscow (Institut meditsinskoy parazitologii i tropicheskoy meditsiny Ministerstva zdravookhraneniya SSSR)

[JS]

V. RELATED ATMOSPHERIC AND ENVIRONMENTAL ASPECTS

SETTLING OF COARSELY DISPERSED AEROSOLS IN THE ATMOSPHERIC BOUNDARY LAYER

Dunskiy, V. F., I. F. Yevdokimov, V. M. Krasil'nikov, K. P. Mikulin, Yu. S. Khel'kin, and Z. M. Yushnyy. Settling of coarsely dispersed aerosols on the underlying surface of the ground. Leningrad. Glavnaya geofizicheskaya observatoriya. Trudy, no. 185, 1966. Voprosy atmosfernoy diffuzii i zagryazneniya vozdukha (Problems of atmospheric diffusion and air pollution), 148-161. AT6035526

Results are presented for field experiments investigating the diffusion of coarsely dispersed aerosols ejected from linear sources into the surface boundary layer of the atmosphere and the settling of the dispersed phase on the surface of the ground. The investigations (June—July 1960 and 1961) involved flights of an AN-2 airplane (170 km/hr speed) fitted with spraying equipment, at heights of 100—600 m above a flat area measuring 10 x 20 km covered with rather homogeneous but not dense vegetation averaging 20—30 cm in height. The spray was a water-glycerin (60% technical grade) mixture. The airplane was flown along the windward side of the test field at a given height approximately perpendicular to the wind direction. A total of 200—400 check points were spaced 500 m apart in transverse rows, 500 or 1000 m apart. Two flat troughs (0.125 m^2) and one glass plate (9 x 12 cm) were used to determine by fluorescence analysis the amount of settled liquid; coated glass plates were used to make a microscopic analysis of the precipitate. After the experiment, the liquid in the troughs was washed off with a specific amount of 0.1% NaOH and 0.1% OP-7 solutions in distilled water. The fluorescein concentration in the wash was measured with an EF-3 fluorometer and the dispersed phase settled in each trough was calculated. The droplets settled on the glass plates were examined in transmitted light under a microscope equipped with an eyepiece and reticle.

Curves were constructed of the total droplet density versus the distance from the source. Subsequent analysis showed that the observed systematically higher values obtained with the fluorescence analysis were due to failure to take account of the natural background effect. However, the agreement was good enough to indicate that both methods were valid.

Meteorological conditions existing during each experiment were checked by taking gradient measurements of the mean wind speed, temperature, and humidity at two points on opposite ends of the field at heights of 0.4 and 1.6 m, and at heights of from 25 to 600 m at one of these points. Twelve experiments were selected for quantitative comparisons; they had been conducted with uniform spraying during steady and favorable (in respect to wind direction) winds and uniform temperature stratification in the surface boundary layer of the atmosphere.

The most important fact determined during the experiments was that such aerosols may settle over areas as large as hundreds of square kilometers in periods measured in tens of minutes or hours, i.e., under conditions when meteorological conditions are functions not only of height, as is usually assumed in the theory of atmospheric diffusion, but of all three spatial coordinates and time. [ER]

FILTRATION OF AEROSOLS BY LAYERS OF FIBROUS MATERIALS

Kolganov, V. A., L. V. Radushkevich, and V. G. Sazanova. Experimental investigation of the process of filtering aerosols with layers of fibrous materials. Zhurnal prikladnoy khimii, v. 39, no. 12, 1966, 2725-2730. AP7003142

The first results obtained in an experimental investigation of aerosol filtration using layers of fibers are presented as a continuation of an earlier study of the precipitation of aerosols on single isolated fibers of various diameters. The experiments were conducted with three-dimensional layers of increasing porosity. The following materials were employed in the experiments: 1) staple fibers of industrial grade nitron with an average diameter of 16 μ, 2) FPP-15 fibrous material with an average fiber diameter of 1.5 μ, and 3) fiberglass with an average diameter of 0.8—0.9 μ. Procedures for preparing the filters from each type of fiber are described. The experiments were conducted with polydispersed polystyrene and vegetable oil aerosols having

known particle-diameter distribution. Aerosol particles first were counted with a continuous flow VDK-4 ultramicroscope to determine initial concentrations, passed through test filters at a constant flow speed, and then redetermined after filtration.

The effectiveness of precipitation η is determined from the filtration coefficient K with the following assumptions: the layers of filter material have uniform porosity, identical diameter, and play the same role in the precipitation of aerosol particles (illustrated in text). Characteristic features of the precipitation of aerosol particles in the three types of filter material are discussed in detail.

The results of these experiments showed that in making the transition from isolated single fibers to layers of the same fibers, the filtration process is complicated by the effects of various factors caused by the structural characteristics of the layers. The following conclusions were drawn: 1) Comparative experiments showed that the nature of the dependence of effectiveness of precipitation on particle sizes for fibers in a layer differed from that for isolated fibers of the same diameter at identical flow speeds. 2) The change from isolated fibers to single fibers in a layer usually decreases the selectivity of aerosol particle sizes. 3) These peculiarities associated with precipitation on fiber layers can be explained by the effect of their structure, the arrangement of fibers, and packing irregularities. [EO]

BACTERIOLOGICAL WEAPONS

Myasnenko, A. Injurious factors. Bacteriological weapons. Voyennyye znaniya, no. 2, 1967, 27-28. AP7009494

Bacteriological weapons are discussed as part of a new series of popularized civil-defense articles, designed to supplement the 21-hr civil-defense course. Material for bacteriological weapons should meet the following require-

ments: it should grow on artificial nutrient media, remain viable and infectious for long periods under adverse conditions, resist drying, infect rapidly and in small doses, and cause severe diseases which are difficult to cure. Diseases which are rare and little studied are preferred. The microorganisms causing plague, anthrax, tularemia, brucellosis, glanders, melidosis, scrub typhus, smallpox, ornithosis, and yellow fever are considered suitable for these purposes. American military specialists in bacteriological weapons consider aerosols the most effective means of dispersing these agents. Clouds or fogs containing microorganisms can be created over several thousand square kilometers of territory. Furthermore, man can be infected by aerosols of diseases not normally spread by this route, such as scrub typhus or yellow fever. Carriers of the chosen microorganisms, such as infected ticks, can also be airdropped in special containers. [JS]

A P P E N D I X

M E D L A R S B I B L I O G R A P H Y
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RUSSIAN AND/OR SOUTHEASTERN ASIA MALARIA, 4=DRUG RESISTANCE, PLASMODIUM FALCIPARUM, 5=EPIDEMIOLOGY.

BLOUNT RE
MANAGEMENT OF CHLOROQUINE-RESISTANT FALCIPARUM MALARIA.
ARCH INTERN MED (CHICAGO) 119:557-60, JUN 67
ASIA, SOUTHEASTERN (1), CAUCASIAN RACE, *CHLOROQUINE/ THERAPEUTIC USE, *DRUG RESISTANCE, MICROBIAL, HUMAN (4), *MALARIA/ DRUG THERAPY, MILITARY MEDICINE, *PLASMODIUM FALCIPARUM/ DRUG EFFECTS, *QUININE/ THERAPEUTIC USE, SULFATES/ THERAPEUTIC USE, UNITED STATES (1), VIETNAM (1)

BLOUNT RF
MANAGEMENT OF CHLOROQUINE-RESISTANT FALCIPARUM MALARIA.
TRANS ROY CLIN CLIMAT ASS 78:196-204, 1967
ADULT, BRAIN DISEASES/ DRUG THERAPY, *CHLOROQUINE/ PHARMACODYNAMICS, *LAPSOID/ THERAPEUTIC USE, PENTAMIDINE/ THERAPEUTIC USE, DRUG RESISTANCE, MICROBIAL, EDEMA/ DRUG THERAPY, HUMAN (4), *MALARIA/ DRUG THERAPY, MALE (4), MILITARY MEDICINE, *PLASMODIUM FALCIPARUM/ DRUG EFFECTS, *PYRIMETHAMINE/ THERAPEUTIC USE, *QUININE/ THERAPEUTIC USE, TROPICAL MEDICINE, UNITED STATES (1), VIETNAM (1)

ECLERE AT, PLENCHAREON S, CADIGAN FC
PREVALENCE OF MALARIA EXHIBITING REDUCED SENSITIVITY TO CHLOROQUINE IN SOUTHERN THAILAND.
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CONTACOS PG, LUNN JS, COATNEY GR
DRUG-RESISTANT FALCIPARUM MALARIA FROM CAMBODIA AND MALAYA.
TRANS ROY SOC TROP MED HYG 57:417-24, NOV 63
CAMBODIA (1), *CHLOROGUANIDE, *CHLOROQUINE, *DRUG RESISTANCE, MICROBIAL, *MALARIA, MALAYSIA (1), *PLASMODIUM FALCIPARUM, *PYRIMETHAMINE, *QUINACRINE, *QUININE

DEGOWIN RL, POWELL RL
DRUG RESISTANCE OF A STRAIN OF PLASMODIUM FALCIPARUM FROM MALAYA.
AMER J TROP MED 14:519-28, JUL 65
AMODIAQUINE, *ANTIMALARIALS, CHLOROQUINE, *DRUG RESISTANCE, MICROBIAL, DRUG THERAPY, HYDROXYCHLOROQUINE, *MALARIA, MALAYSIA (1), *PLASMODIUM FALCIPARUM, PYRIMETHAMINE, QUINACRINE, QUININE

DEVAKUL K, PARIPASUTA T, P ID HA
125-I-LABELLED FIBRINOGEN IN CEREBRAL MALARIA.
LANCET 2:886-7, 22 OCT 66
ADOLESCENCE, ADULT, BLOOD COAGULATION, *BRAIN DISEASES/ ETIOLOGY,
*CHLOROQUINE/ THERAPEUTIC USE, DRUG RESISTANCE, MICROBIAL,
*FIBRINOGEN, HUMAN (4), *INJECTIONS, INTRAVENOUS, *IODINE
ISOTOPES/ THERAPEUTIC USE, LIVER FUNCTION TESTS, *MALARIA/
COMPLICATIONS, MIDDLE AGED, *PLASMODIUM FALCIPARUM/ DRUG EFFECTS,
PROTHROMBIN TIME, QUININE/ THERAPEUTIC USE, THAILAND (1)

EBISAWA I, KANIKI M
IMPORTED FALCIPARUM MALARIA WITH INADEQUATE RESPONSE TO CHLOROQUINE.
JAP J EXP MED 36:601-7, DEC 66
ADULT, AMBULATORY CARE (3), CHLOROQUINE/ ADMINISTRATION & DOSAGE,
*CHLOROQUINE/ THERAPEUTIC USE, COMMUNICABLE DISEASE CONTROL,
HUMAN (4), JAPAN (1), MALARIA/ DRUG THERAPY, *MALARIA/
OCCURRENCE, MALE (4), *PLASMODIUM FALCIPARUM, PRIMAQUINE/
THERAPEUTIC USE, *QUININE/ THERAPEUTIC USE, THAILAND (1)

EPPES RB, DEGOWIN RL, POWELL RD
CLINICAL STUDIES WITH A CHLOROQUINE-RESISTANT STRAIN OF PLASMODIUM
FALCIPARUM FROM VIETNAM.
MILIT MED 131:362-71, APR 66
ADULT, *CHLOROQUINE/ THERAPEUTIC USE, CLINICAL RESEARCH (4),
COMPARATIVE STUDY (4), *DRUG RESISTANCE, MICROBIAL, HUMAN (4),
MALE (4), *PLASMODIUM FALCIPARUM/ DRUG EFFECTS, *PYRIMETHAMINE/
THERAPEUTIC USE, *QUININE/ THERAPEUTIC USE, VIETNAM (1)

EYLES DE, HOO CC, WARREN M
PLASMODIUM FALCIPARUM RESISTANT TO CHLOROQUINE IN CAMBODIA.
AMER J TROP MED 12:840-3, NOV 63
CAMBODIA (1), *CHLOROQUINE, DRUG RESISTANCE, MICROBIAL,
*PLASMODIUM FALCIPARUM, PYRIMETHAMINE, QUININE

EYLES DE, WHARTON RH, CHEONG KH
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*ANOPHELES, CAMBODIA (1), *MALARIA, *MONKEY DISEASES,
PLASMODIUM, PLASMODIUM FALCIPARUM, PLASMODIUM MALARIAE,
STATISTICS

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SULPHORMETHOXINE IN CHLOROQUINE-RESISTANT FALCIPARUM MALARIA IN
THAILAND.
LANCET 1:1117-9, 27 MAY 67
*CHLOROQUINE/ THERAPEUTIC USE, *DRUG RESISTANCE, MICROBIAL,
FEMALE (4), HUMAN (4), *MALARIA/ DRUG THERAPY, MALE (4),
*PLASMODIUM FALCIPARUM/ DRUG EFFECTS, *SULFONAMIDES/ THERAPEUTIC
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LANCET 2:657-60, 2 OCT 65
ADOLESCENCE, CHILD, CHILD, PRESCHOOL, *CHLOROQUINE/ THERAPEUTIC USE, *DRUG RESISTANCE, MICROBIAL, HUMAN (4), INFANT, *MALARIA/ DRUG THERAPY, *PLASMODIUM FALCIPARUM/ DRUG EFFECTS, *QUINACRINE/ THERAPEUTIC USE, *QUININE/ THERAPEUTIC USE, THAILAND (1)

JEFFERY GM, COLLINS WE, SKINNER JC
ANTIMALARIAL DRUG TRIALS C. A MULTIRESISTANT STRAIN OF PLASMODIUM FALCIPARUM.
AMER J TROP MED 12:844-50, NOV 63
*AMODIAQUINE, *ANTIMALARIALS, *CHLOROQUINE, DRUG RESISTANCE, MICROBIAL, *PLASMODIUM FALCIPARUM, *PRIMAQUINE, *PYRIMETHAMINE, *QUININE, THAILAND (1)

KRUATRACHUE M, KLONGKUMNUAN HARA K, HARINASUTA C
INFECTION-RATES OF MALARIAL PARASITES IN RED BLOOD-CELLS WITH NORMAL AND DEFICIENT GLUCOSE-6-PHOSPHATE-DEHYDROGENASE.
LANCET 1:404-6, 19 FEB 66
*ERYTHROCYTES/ ENZYMOLOGY, FEMALE (4), *GLUCOSEPHOSPHATE DEHYDROGENASE DEFICIENCY/ OCCURRENCE, HUMAN (4), *MALARIA/ OCCURRENCE, MALE (4), *PLASMODIUM FALCIPARUM/ PATHOGENICITY, STAINS AND STAINING, THAILAND (1)

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APPARENT REFRACTORINESS TO CHLOROQUINE, PYRIMETHAMINE, AND QUININE IN STRAINS OF PLASMODIUM FALCIPARUM FROM VIETNAM.
MILIT MED 130:168-76, FEB 65
*CHLOROQUINE, DRUG RESISTANCE, MICROBIAL, DRUG THERAPY, *MALARIA, MILITARY MEDICINE, *PLASMODIUM FALCIPARUM, *PYRIMETHAMINE, *QUININE, VIETNAM (1)

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MALARIA--A MILITARY MEDICAL PROBLEM YET WITH US.
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*ANTIMALARIALS/ THERAPEUTIC USE, HUMAN (4), MALARIA/ DRUG THERAPY, MALARIA/ MORTALITY, *MALARIA/ OCCURRENCE, *MILITARY MEDICINE, *PLASMODIUM FALCIPARUM, VIETNAM (1)

MONTGOMERY R, EYLES DE
CHLOROQUINE RESISTANT FALCIPARUM MALARIA IN MALAYA.
TRANS ROY SOC TROP MED HYG 57:409-16, NOV 63
*CHLOROGUANIDE, *CHLOROQUINE, *DRUG RESISTANCE, MICROBIAL, *MALARIA, MALAYSIA (1), *PLASMODIUM FALCIPARUM

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REPORT OF A CASE FROM THAILAND.
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*MALARIA, PLASMODIUM FALCIPARUM, THAILAND (1)

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RESEARCH (3), *DRUG RESISTANCE, MICROBIAL, HYDROXYCHLOROQUINE,
MALARIA, PHARMACOLOGY, *PLASMODIUM FALCIPARUM, PYRIMETHAMINE,
QUINACRINE, QUININE, THAILAND (1)

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FROM VIET-NAM.
BULL WHO 31:379-92, 1964
*ANTIMALARIALS, *CHLOROQUINE, CLINICAL RESEARCH (3), DRUG
THERAPY, *MALARIA, PHARMACOLOGY, *PLASMODIUM FALCIPARUM,
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PHOSPHATE AGAINST THE ASEXUAL ERYTHROCYTIC FORMS OF A STRAIN OF
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EXPERIMENTAL LAB STUDY (4), INSECTICIDES, *PLASMODIUM FALCIPARUM,
*QUINOLINES, THAILAND (1)

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INVESTIGATION OF THE POSSIBILITY TO RESTRAIN THE DEVELOPMENT OF
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OF CHLOROIDINE WITH HALOQUINE) (RUS)
MED PARAZIT (MOSKVA) 34:434-9, JUL-AUG 65
ANIMAL EXPERIMENTS (4), *ANTIMALARIALS/ THERAPEUTIC USE, DRUG
RESISTANCE, MICROBIAL, *MALARIA, AVIAN/ DRUG THERAPY,
*PYRIMETHAMINE/ THERAPEUTIC USE

RIECKMANN KH
A FIELD STUDY ON THE EFFECTS OF A COMBINATION OF CYCLOGUANIL PAMOATE AND AMODIAQUINE AGAINST MALARIA IN THE MABALL AREA OF NEW GUINEA.
AMER J TROP MED 15:833-7, NV 66
ADOLESCENCE, ADULT, AGED, *AMODIAQUINE/ ADMINISTRATION & DOSAGE, *ANTIMALARIALS/ ADMINISTRATION & DOSAGE, CHILD, CHILD, PRESCHOOL, DELAYED-ACTION PREPARATIONS, HUMAN (4), INFANT, INJECTIONS, INTRAMUSCULAR, MIDDLE AGED, NEW GUINEA (1), PLASMODIUM FALCIPARUM, PLASMODIUM VIVAX

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ACTIVE AND PASSIVE IMMUNIZATION OF CHIMPANZEES INFECTED WITH WEST AFRICAN AND SOUTHEAST ASIA STRAINS OF PLASMODIUM FALCIPARUM.
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CHLOROQUINE-RESISTANT STRAIN OF PLASMODIUM FALCIPARUM FROM KHAO YAI KHARO, THAILAND.
AMER J TROP MED 14:354-7, MAY 65
*CHLOROQUINE, *DRUG RESISTANCE, MICROBIAL, DRUG THERAPY, *MALARIA, *PLASMODIUM FALCIPARUM, *PRIMAQUINE, *PYRIMETHAMINE, *QUININE, THAILAND (1)

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DRUG-RESISTANCE IN FALCIPARUM MALARIA IN SOUTH-EAST ASIA.
MED J MALAYA 18:172-83, MAR 64
ADOLESCENCE, ASIA, SOUTHEASTERN (1), CHILD, *CHLOROGUANIDE, *CHLOROQUINE, DRUG RESISTANCE, MICROBIAL, DRUG THERAPY, *MALARIA, *PLASMODIUM FALCIPARUM, *PYRIMETHAMINE, *QUINACRINE, *QUININE, STATISTICS, TOXICOLOGIC & POST (4)

SANDOSHAM AA
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*CHLOROQUINE, *DRUG RESISTANCE, MICROBIAL, *MALARIA, MALAYSIA (1)

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SUPPLEMENTAL SULFONE (DAPSONE) THERAPY. USE IN TREATMENT OF
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ARCH INTERN MED (CHICAGO) 119:561-6, JUN 67
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CAUCASIAN RACE, *CHEMISTRY, PHYSICAL/ THERAPEUTIC USE, DAPSONE/
ADVERSE EFFECTS, *DAPSONE/ THERAPEUTIC USE, HUMAN (4), *MALARIA/
DRUG THERAPY, MALE (4), MILITARY MEDICINE, *PLASMODIUM
FALCIPARUM/ DRUG EFFECTS, PSYCHOSES, TOXIC, *QUININE/ THERAPEUTIC
USE, UNITED STATES (1), VIETNAM (1)

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SUSCEPTIBILITY OF THE GIBBON HYLOBATES LAR TO FALCIPARUM MALARIA.
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*MALARIA/ IMMUNOLOGY, *PLASMODIUM FALCIPARUM/ PATHOGENICITY,
SPLENECTOMY, THAILAND (1)

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FILARIASIS AMONG ABORIGINES IN MALAYA.
ANN TROP MED PARASIT 57:238-54, JUN 63
AEDES, ANOPHELES, CULEX, EPIDEMIOLOGY, *FILARIASIS, HEALTH
SURVEYS, *MALARIA, MALAYSIA (1), *MOSQUITOES, PLASMODIUM
FALCIPARUM, PLASMODIUM MALARIAE, PLASMODIUM VIVAX, WUCHERERIA

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(FIVE CASES OF MALARIA CAUSED BY PLASMODIUM FALCIPARUM) (POL)
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RESISTANCE, MICROBIAL, *PLASMODIUM FALCIPARUM, PYRIMETHAMINE,
QUINACRINE, QUININE, THAILAND (1)

(ANONYMOUS)
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NEW ISOLATIONS OF P. CYNOMOLGI AND P. INUI FROM A. E. BALABACENSIS IN PERLIS.
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ANIMAL EXPERIMENTS (4), *INSECT VECTORS, *MALARIA, MALAYSIA (1), MONKEYS, *MOSQUITOES, *PLASMODIUM/ ISOLATION & PURIFICATION

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*ANOPHELES, *INSECT VECTORS, *MALARIA/ OCCURRENCE, MALAYSIA (1)

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MALARIA ANTIBODY AND GAMMA-GLOBULIN LEVELS IN MELANESIAN CHILDREN IN NEW GUINEA.
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PLAN FOR ITS PREVENTION. 4. INVESTIGATIONS MADE IN 1962) (POR)
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*HEMOGLOBINS, ABNORMAL, *MALARIA, MALARIA CONTROL, THAILAND (1),
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FLATZ G, SRINGAM S
MALARIA AND GLUCOSE-6-PHOSPHATE DEHYDROGENASE DEFICIENCY IN
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LANCET 2:1246-50, 14 DEC 63
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DEFICIENCY, INFANT, NEWBORN, *MALARIA, MIDDLE AGE, THAILAND (1)

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ZHORLANKIA TK, CHKHAIDZE T
(CHLOROQUINE RESISTANCE IN PATIENTS WITH TERTIAN MALARIA TREATED WITH
CLOROQUINE) (RUS)
MED PARAZIT (MOSKVA) 33:69-70, JAN-FEB 64
*ANTIMALARIALS, GEORGIA (1), *MALARIA, *MALARIA CONTROL